Claims

What is claimed is:

5   1. A method comprising:

receiving a resonant frequency of an apparatus as an input;

calculating a set of coefficients for a notch filter, wherein the notch

filter has a notch frequency that is approximately equal to the resonant

frequency and wherein the set of notch filter coefficients are calculated

10   using fixed-point arithmetic; and

programming a digital filter in the apparatus in accordance with the

set of notch filter coefficients,

whereby a notch filter that attenuates the resonant frequency is

obtained.

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2. The method of claim 1, wherein the set of coefficients are calculated by

evaluating a polynomial.

3. The method of claim 2, wherein the polynomial is a polynomial

20   interpolation of a non-linear function.

4. The method of claim 3, wherein the non-linear function is derived from a

transformation of a notch filter transfer function from the s-domain to the

z-domain.

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5. The method of claim 4, wherein the non-linear function is derived from a

bilinear transformation of the notch filter transfer function from the s-

domain to the z-domain.

6. The method of claim 1, wherein the set of coefficients are calculated by evaluating an interpolating function that approximates an original function.

7. The method of claim 6, wherein the original function is derived from a z-domain notch filter transfer function.

8. The method of claim 7, wherein the z-domain notch filter transfer function is obtained by transformation of an z-domain notch filter transfer function.

9. The method of claim 8, wherein the z-domain notch filter transfer function is obtained by bilinear transformation of the s-domain notch filter transfer function.

10. The method of claim 1, wherein the notch filter is a digital notch filter.

11. An apparatus comprising:

a moveable assembly susceptible to a resonant frequency;

control circuitry that controls the moveable assembly, the control circuitry is adapted to:

calculating a set of coefficients for a filter, wherein the filter has an attenuation frequency that is approximately equal to the resonant frequency and wherein the set of coefficients are calculated using fixed-point arithmetic; and

programming a digital filter in the apparatus in accordance with the set of notch filter coefficients.

12. The apparatus of claim 11, wherein the set of coefficients are calculated by evaluating a polynomial.

13. The apparatus of claim 12, wherein the polynomial is a polynomial interpolation of a non-linear function.

14. The apparatus of claim 13, wherein the non-linear function is derived from a transformation of a notch filter transfer function from the s-domain to the z-domain.

15. The apparatus of claim 14, wherein the non-linear function is derived from a bilinear transformation of the notch filter transfer function from the s-domain to the z-domain.

16. The apparatus of claim 11, wherein the set of coefficients are calculated by evaluating an interpolating function that approximates an original function.

17. The apparatus of claim 16, wherein the original function is derived from a z-domain notch filter transfer function.

18. The apparatus of claim 17, wherein the z-domain notch filter transfer function is obtained by transformation of an z-domain notch filter transfer function.

19. The apparatus of claim 18, wherein the z-domain notch filter transfer function is obtained by bilinear transformation of an s-domain notch filter transfer function.

20. The apparatus of claim 11, wherein the notch filter is a digital notch filter.

21. An apparatus comprising:

at least one processor;

memory; and

a set of instructions in the memory,

wherein the at least one processor executes the set of instructions to perform actions that include:

receiving a desired notch frequency as input;

calculating a set of notch filter coefficients for a notch filter having the desired notch frequency, and wherein the set of notch filter coefficients are calculated using fixed-point arithmetic; and

writing the set of notch filter coefficients to the memory so as to program a digital filter in accordance with the set of notch filter coefficients,

whereby a notch filter that attenuates the resonant frequency is obtained.

22. The apparatus of claim 21, wherein the at least one processor executes additional instructions that implement the programmed digital filter.

23. The apparatus of c11A, wherein the set of notch filter coefficients are calculated by evaluating an interpolating function that approximates an original function.

24. The apparatus of claim 23, wherein the original function is derived from a z-domain notch filter transfer function.

25. The apparatus of claim 24, wherein the z-domain notch filter transfer function is obtained by transformation of an z-domain notch filter transfer function.

26. The apparatus of claim 25, wherein the z-domain notch filter transfer function is obtained by bilinear transformation of an s-domain notch filter transfer function.